Welcome to the 2017 BTO Peer Review

Building Energy Efficiency, the Building Technologies Office, and Peer Review

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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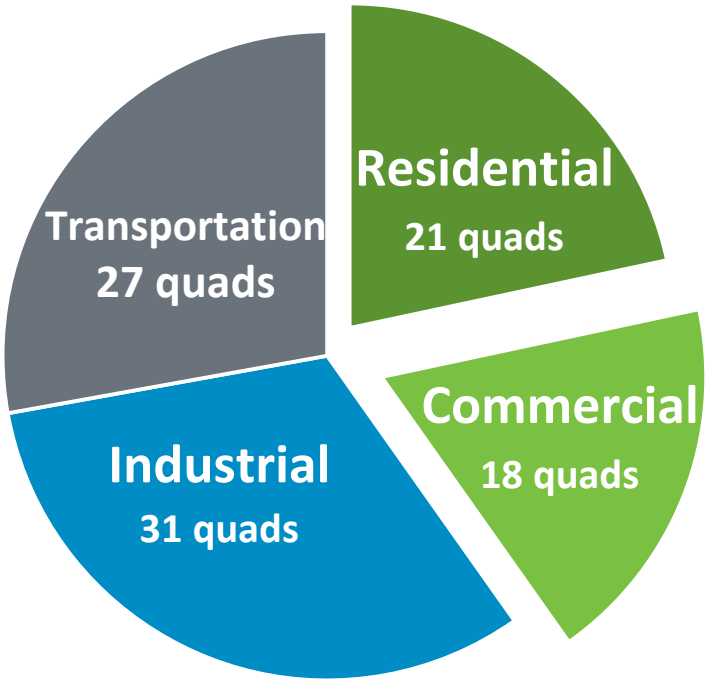
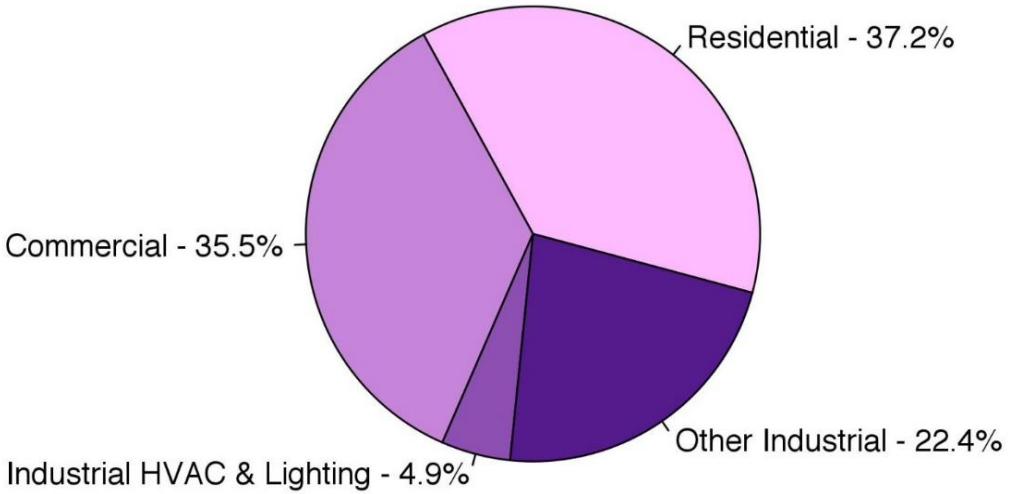
Director
March 13, 2017

U.S. Energy and Electricity Consumption by Sector

Energy Use



Electricity Use



* Industrial HVAC and lighting data based on 2006 MECS

Buildings Energy Use: 40% of U.S. total

Buildings Electricity Use: 75% of U.S. total

U.S. Building Energy Bill: $410 billion per year

The Complexity of Energy Use in the Buildings Market

SECTOR

113.6 million housing units

224 billion sq. ft.

21 quads

5.6 million commercial buildings

87 billion sq. ft.

18 quads

CONSTRUCTION TYPE

- New Construction
- Retrofit

Sample Envelope Types

- Masonry
- Wood frame
- Metal frame

- New Construction
- Retrofit

BUILDING USE

- Single-Family
- Multi-Family
- Manufactured Housing
- Food Service
- Retail
- Hospitality
- Office
- Education
- Healthcare
- Grocery
- Public

CLIMATE

- Marine
- Cold/Very Cold
- Hot Humid
- Hot Dry/ Mixed Dry
- Mixed Humid

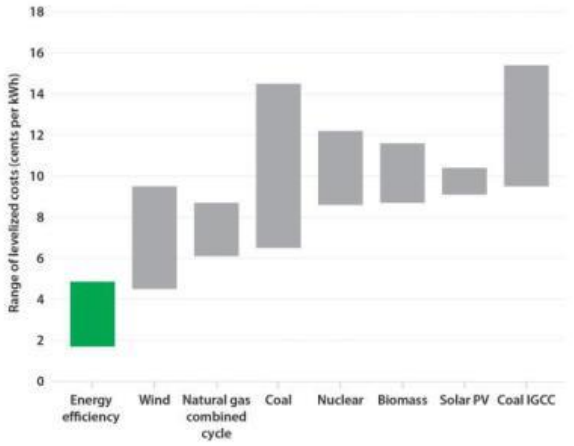
OCCUPANCY

- Owner-Occupied
- Tenant-Occupied
  - Tenant Pays Energy Costs
  - Owner Pays Energy Costs

Sample Technology Areas (Gas and Electric)

Energy Efficiency -- Lower Costs, Improved Affordability

Low Cost Energy

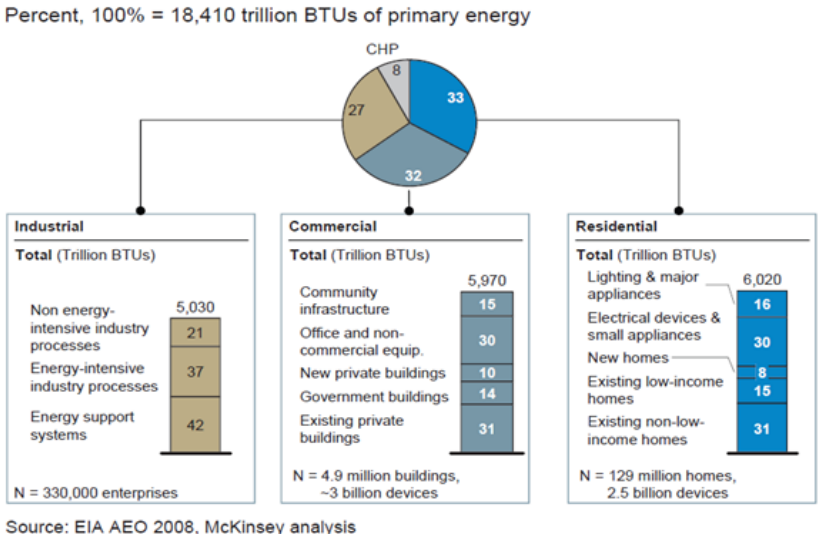


Cost-Effective Across All Sectors

Sector	Levelized CSE (6% Discount) ($/kWh)
Commercial & Industrial (C&I)	$ 0.021
Residential	$ 0.018
Low Income	$ 0.070
Cross Sectoral/Other	$ 0.017
National CSE	$ 0.021

Source: LBNL (2014), ACEEE (2014)

Offers savings of over $100 B/year across the economy…



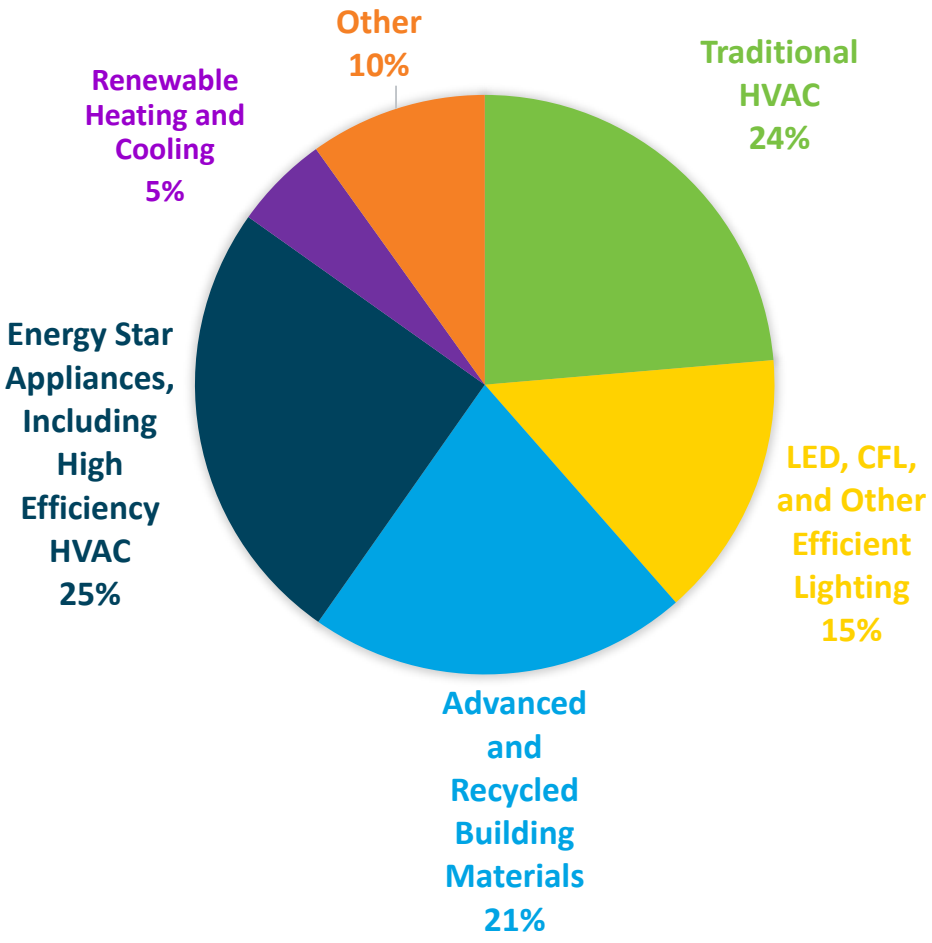
Source: EIA AEO 2008, McKinsey analysis

…With greater savings from targeted RD&D

The Energy Efficiency Economy is Full of Opportunity

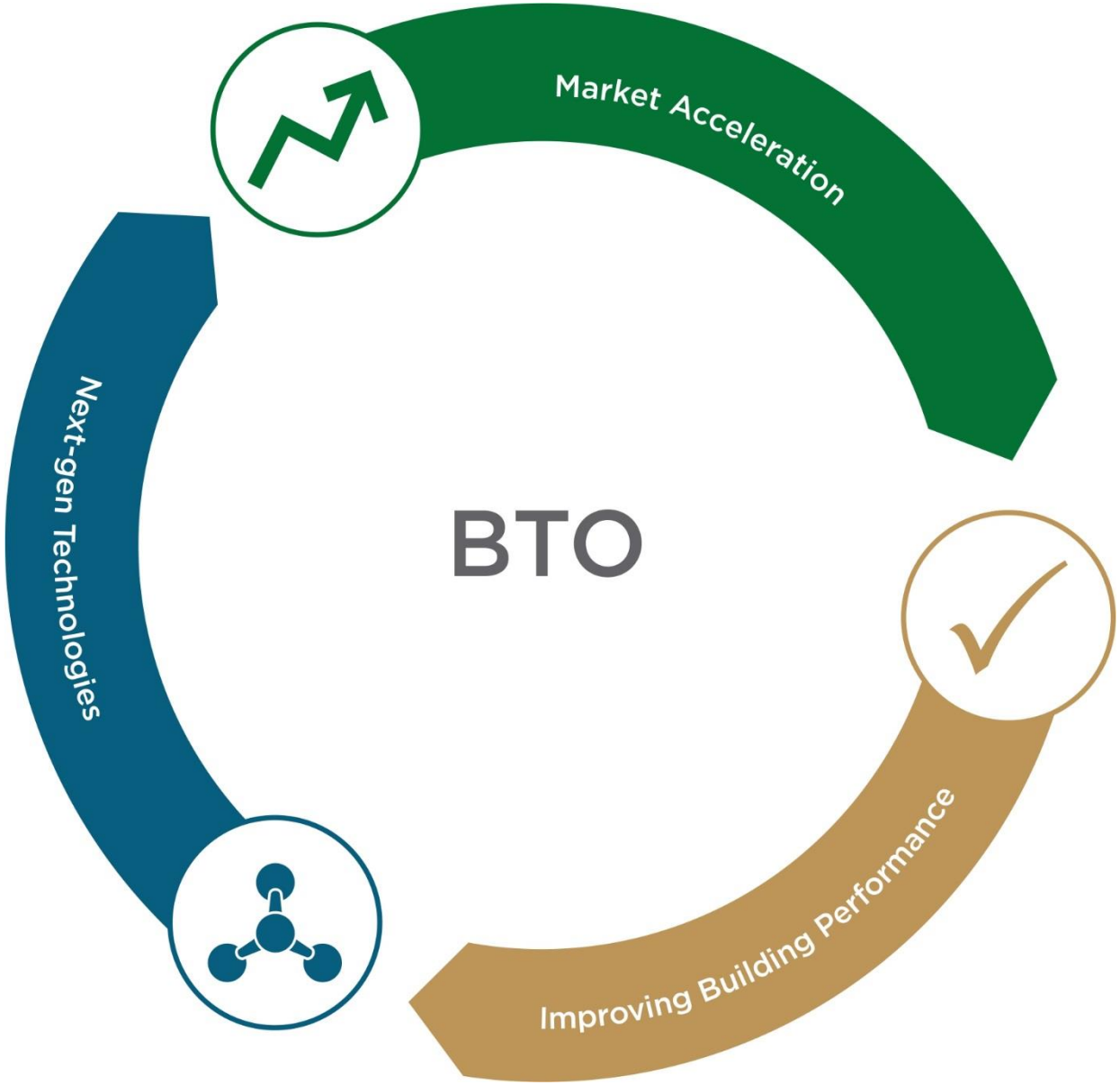
- Energy efficiency supports **2.2 million jobs** across the country
- Over **130,000** energy efficiency jobs were added in 2016
- Almost **290,000 manufacturing jobs** produce Energy Star products and energy efficient building materials
- Approximately **21% of construction workers** in the US support the construction or installation of energy efficiency technologies

U.S. ENERGY EFFICIENCY EMPLOYMENT



Source: U.S. Energy and Employment Report, 2017, U.S. Department of Energy

Making an Impact: BTO Strategy



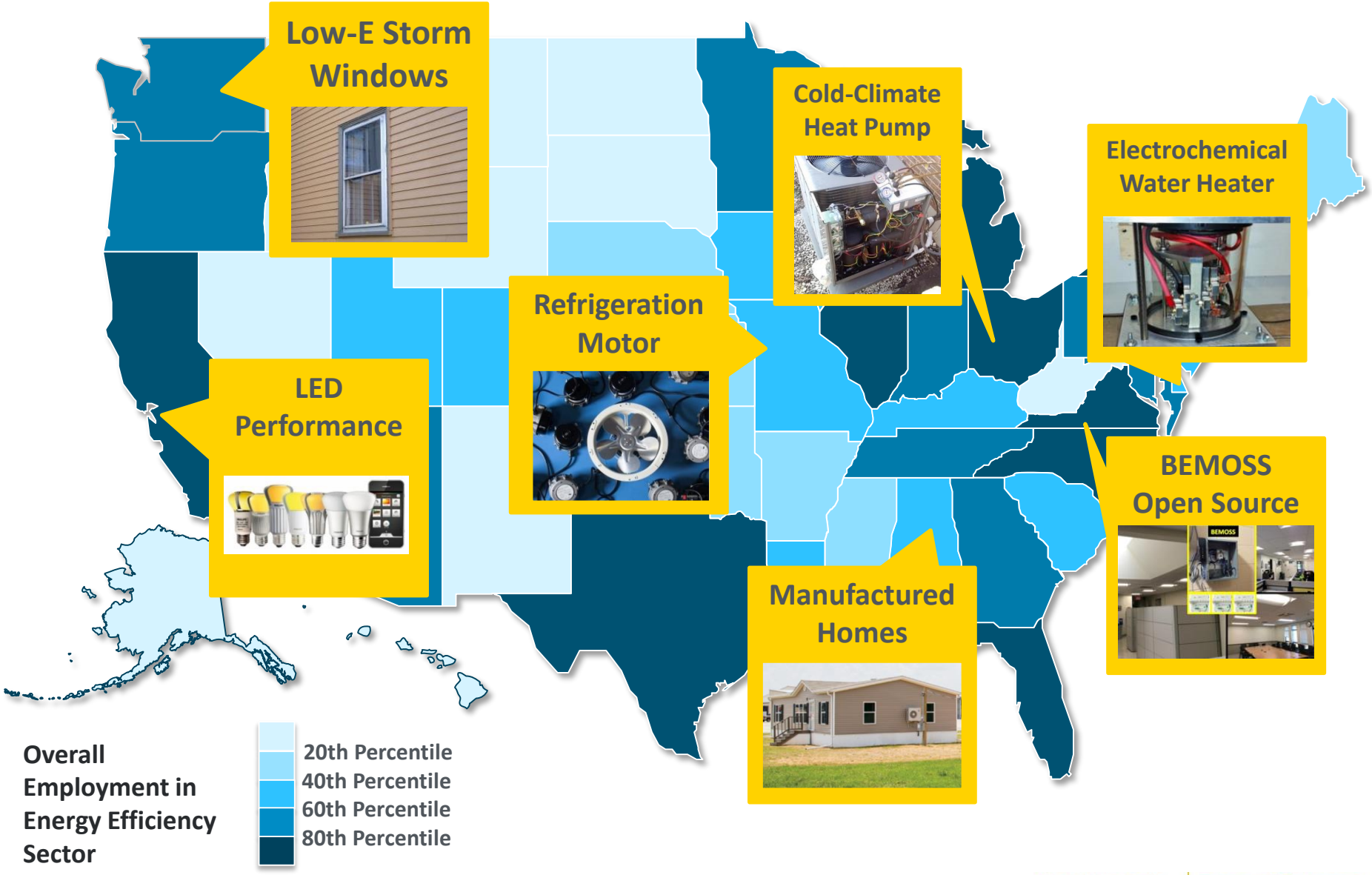
Making an Impact: BTO Approach

Making an Impact: BTO Approach

- Promotes Economic Competitiveness
- Creates Jobs
- Lowers Utility Bills, Saving Money
- Improves Occupant Productivity, Health, & Comfort

Image courtesy of VMDO.

Building Energy Efficiency Reaches Across Every State



Source: U.S. Energy and Employment Report, 2017, U.S. Department of Energy

Areas of Interest to BTO

- Transactive Energy & Connectivity
- Advanced HVAC
- Zero Energy Buildings
- Community-Scale Building Efficiency
- Miscellaneous Electric Loads
- Building Energy Data

FY 2017 Peer Review Objectives and Evaluation Criteria

Objectives

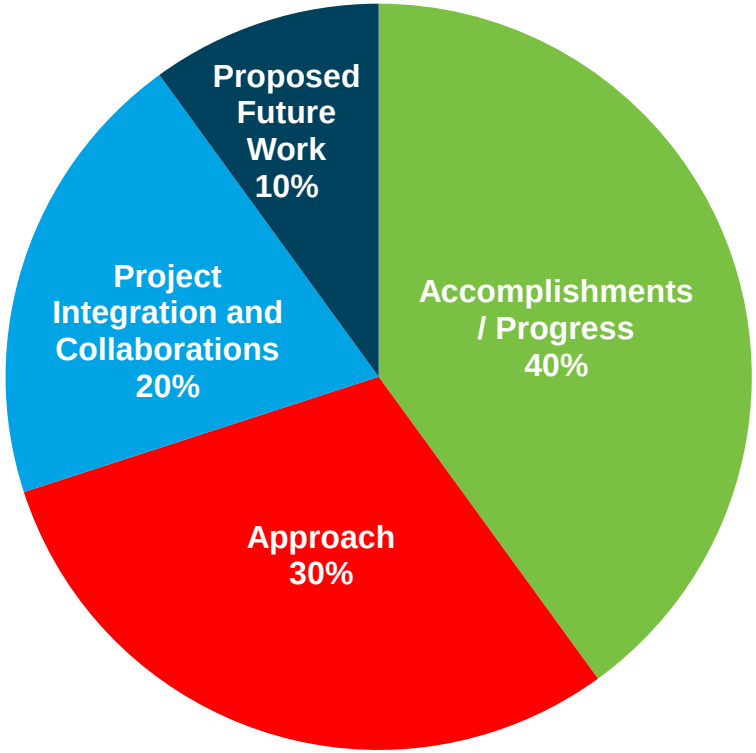
1. Communicate BTO program activities and their connections, highlighting: what we do; transparency; progress being made with taxpayer dollars.

2. Objectively evaluate BTO projects.

3. Provide a forum that promotes the creation of more collaboration and partnerships.

4. Demonstrate DOE's role in energy efficiency.

Evaluation Criteria Weighting



2017 PROJECT PEER REVIEW

U.S. DEPARTMENT OF ENERGY
BUILDING TECHNOLOGIES OFFICE

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Peer Review Agenda - Day 1

Crystal Ballroom (Plenary) Lincoln (Poster Session)	
Time	Presentation and Speaker
9:35-10:30	Buildings Energy Efficiency: Where Are We Know, Where Are We Going? *Facilitator: Leslie Nicholls, DOE* **Panelists: Jud Virden, PNNL; Admiral Cosgriff, NEMA; Clayton Traylor, LBA; and Steve Nadel, ACEEE**
10:30-11:00	**BREAK (30 min)**
11:00-12:30	Future of Buildings-to-Grid *Facilitator: Dan Delurey, Wedgemere* **Panelists: Kelly Speakes-Backman, ASE; Gene Rodrigues, ICF; Angela Becker-Dippman, Senate ENR; Christopher Irwin, DOE; and David Nemtzow, DOE**
12:30-1:30	**LUNCH (1 hour)**
5:30-7:00	**POSTER SESSION (Lincoln Hall)** **Networking/ Social Hour**